UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,106	02/12/2001	Karl J. Bois	10006879-1	9718

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EXAMINER
DAY, HERNG DER

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/782,106	BOIS ET AL.
	Examiner	Art Unit	
	Herng-der Day	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☒ Claim(s) *20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 December 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some *   c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is in response to Applicants' Response ("Response") to Office

Action dated September 13, 2004, mailed December 13, 2004.

1-1.   Claims 3-4, 7-8, 10, 12-14, 17-18, and 20 have been amended. Claims 1-20 are pending.

1-2.   Claims 1-20 have been examined.

Drawings

2.   The drawings are objected to for the following reasons. Corrected drawing sheets in

compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid

abandonment of the application. Any amended replacement drawing sheet should include all of

the figures appearing on the immediate prior version of the sheet, even if only one figure is being

amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header

(as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes

are not accepted by the Examiner, the Applicants will be notified and informed of any required

corrective action in the next Office action. The objection to the drawings will not be held in

abeyance.

2-1.   Figure 4 should be designated by a legend such as --Prior Art-- because only that which is

old is illustrated. See MPEP § 608.02(g).

2-2.   It appears that "MODEL R AND C IN SERIES ...", as shown in block 130 of FIG. 6,

should be "MODEL R AND L IN SERIES ...".

Specification

3.   The disclosure is objected to because of the following informalities:

Appropriate correction is required.

3-1.   It appears that "where the resistance and capacitance are connected in series and the

capacitance in parallel, as shown in Figure 4", as described in lines 14-15 of page 5, should be

"where the resistor and inductor are connected in series and the capacitor in parallel, as shown in

Figure 4".

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

5.   Claims 6 and 19 are rejected under 35 U.S.C. 112, first paragraph, as containing subject

matter which was not described in the specification in such a way as to enable one skilled in the

art to which it pertains, or with which it is most nearly connected, to make and/or use the

invention.

5-1.   Claims 6 and 19 recite the limitation "modeling a skin effect resistance and a skin effect

inductance using an R-L tank circuit connected to the second port" in each claim. However, no

details have been disclosed in the specification regarding how to connect the R-L tank circuit to

the second port when the scattering matrix has been connected to the second port already as

recited in claim 1. Therefore, without undue experimentation, it is unclear for one skilled in the

art how to connect the R-L tank circuit to the second port.

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7.   Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7-1.   Claim 15 recites the limitation "the reflection coefficients" in line 3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

8.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9.   Claims 1-13 are rejected under 35 U.S.C. 101 because the inventions as disclosed in claims are directed to non-statutory subject matter.

9-1.   Regarding claims 1-7, it appears to be directed merely to an abstract idea of modeling dielectric losses in a transmission line without resulting in a practical application producing a concrete, useful, and tangible result. Furthermore, it is not tangibly embodied because it could be practiced with pencil and paper.

9-2.   Regarding claims 8-13, it appears to be directed merely to an abstract idea for simulating a transmission line without resulting in a practical application producing a concrete, useful, and tangible result. Furthermore, it is not tangibly embodied because it could be practiced with pencil and paper.

9-3.   The Examiner acknowledges that even though the claims are presently considered non-

statutory they are additionally rejected below over the prior art. The Examiner assumes the

Applicants will amend the claims to overcome the 101 rejections and thus make the claims

statutory.

Recommendations

10.   Claim 1 recites the limitations "for a line" in line 3 of the claim. For clarification

purposes, the Examiner suggests that "for a line" be replaced with "for a transmission line".

11.   Claim 8 recites the limitations "the line" in lines 4-6 and 10 of the claim. For

clarification purposes, the Examiner suggests that "the line" be replaced with "the transmission

line".

12.   Claim 14 recites the limitations "having a first and second port" in line 5 of the claim.

For clarification purposes, the Examiner suggests that "having a first and second port" be

replaced with "having a first port and a second port".

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

14.   Claims 1, 3-12, 14, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Yu et al., "Computational Models of Transmission Lines with Skin Effects and Dielectric

Loss", IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications,

volume 41, Issue 2, pages 107-119, February 1994, in view of Applicants' assertions.

14-1.   Regarding claim 1, Yu et al. disclose a method of modeling dielectric losses in a

transmission line, the method comprising:

modeling a resistance, a self-inductance, and a self-capacitance for a line as a lumped

element circuit having a first port and a second port, where a signal is received on the first port

(Let L, R, G, C be the inductance, resistance, conductance and capacitance per unit length of a

line, pages 107-108, section II, Lumped Models of Frequency-Dependent Factors); and

modeling a dielectric loss (dielectric loss, page 108, section 2.1, Model of Dielectric

Loss).

Yu et al. fail to expressly disclose the modeled dielectric loss as a scattering matrix

connected to the second port. Nevertheless, Yu et al. disclose the model of Y_d is simply a

parallel or serial connection of the one-ports shown in Fig. 1 (page 108, left column, the last

paragraph in section 2.1). Furthermore, Yu et al. disclose cascading a number of 2-port cells

forms the basis of Yu's method (page 110, left column, the last paragraph in section 3.1). In

other words, the one-port model of Y_d will be effectively represented as a two-port matrix by

cascading.

In the specification, Applicants assert in lines 4-5 of page 4, "As used herein, an S-

parameter matrix, [S], refers to any matrix used to represent a two port circuit element".

It would have been obvious to one of ordinary skills in the art at the time the invention

was made to modify the teachings of Yu et al. to incorporate the Applicants' assertions to obtain

the invention as specified in claim 1 because based on Applicants' assertions Yu's model of Y_d would be interpreted as a scattering matrix connected to the second port.

14-2. Regarding claim 3, Yu et al. further disclose the scattering matrix uses values that vary with a frequency of a signal transmitted via the transmission line ($Y_d(s)$, page 108, left column, section 2.1; the reference frequency, which is usually taken from the signal frequency, page 118, left column, paragraph 1).

14-3. Regarding claim 4, Yu et al. further disclose the scattering matrix uses values that are related to the dielectric constant of a material in which the transmission line is embedded (dielectric loss, page 108, section 2.1, Model of Dielectric Loss).

14-4. Regarding claim 5, Yu et al. further disclose comprising calculating the resistance, inductance, and capacitance (Example, page 117, left column, section 5.1).

14-5. Regarding claim 6, Yu et al. further disclose comprising modeling a skin effect resistance and a skin effect inductance using an R-L tank circuit connected to the second port (Model of skin effect, page 108, Fig. 2 and section 2.2).

14-6. Regarding claim 7, Yu et al. further disclose comprising modeling the dielectric losses using circuit simulation software (using our model run in SPICE, page 117, right column, paragraph 1).

14-7. Regarding claim 8, Yu et al. disclose a method for simulating a transmission line comprising:

determining a resistance of a transmission line; determining a self-inductance of the line; determining a self-capacitance of the line (Example, page 117, left column, section 5.1);

creating a computer model of the line as a schematic having first and second ports (the

model is based on the characteristic 2-port of the line, page 107, right column, paragraph 4);

modeling the resistance as a resistor in series with an inductor that represents the self-

inductance; modeling the self-capacitance as a capacitor connected to the line (Let L, R, G, C be

the inductance, resistance, conductance and capacitance per unit length of a line, pages 107-108,

section II, Lumped Models of Frequency-Dependent Factors); and

modeling a dielectric loss (dielectric loss, page 108, section 2.1, Model of Dielectric

Loss).

Yu et al. fail to expressly disclose the modeled dielectric loss as a scattering matrix

connected to the second port, wherein the scattering matrix represents conductance of the

transmission line across a band of frequencies. Nevertheless, Yu et al. disclose the model of

$Y_d(s)$ is simply a parallel or serial connection of the one-ports shown in Fig. 1 (page 108, left

column, the last paragraph in section 2.1). Furthermore, Yu et al. disclose cascading a number of

2-port cells forms the basis of Yu's method (page 110, left column, the last paragraph in section

3.1). In other words, the one-port model of Y_d will be effectively represented as a two-port

matrix by cascading.

In the specification, Applicants assert in lines 4-5 of page 4, "As used herein, an S-

parameter matrix, [S], refers to any matrix used to represent a two port circuit element".

It would have been obvious to one of ordinary skills in the art at the time the invention

was made to modify the teachings of Yu et al. to incorporate the Applicants' assertions to obtain

the invention as specified in claim 8 because based on Applicants' assertions Yu's model of

$Y_d(s)$ would be interpreted as a scattering matrix connected to the second port.

14-8. Regarding claim 9, Yu et al. further disclose comprising modeling a signal received on the first port (source signal, page 117, left column, the second paragraph in section 5.1).

14-9. Regarding claim 10, Yu et al. further disclose the scattering matrix uses values that are related to the dielectric constant of a material in which the transmission line is embedded (dielectric loss, page 108, section 2.1, Model of Dielectric Loss).

14-10. Regarding claim 11, Yu et al. further disclose the transmission line is a line on an electronic circuit board or an integrated circuit chip (VLSI design, page 118, left column, paragraph 1).

14-11. Regarding claim 12, Yu et al. further disclose the transmission line is simulated using circuit simulation software (using our model run in SPICE, page 117, right column, paragraph 1).

14-12. Regarding claims 14, 16, 17, and 19, these medium claims include equivalent method limitations as in claims 1, 3, 4, and 6 and are unpatentable using the same analysis of claims 1, 3, 4, and 6.

14-13. Regarding claim 18, this medium claim include equivalent method limitations as in claims 5 and 7 and are unpatentable using the same analysis of claims 5 and 7.

15. Claims 2 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Yu et al., "Computational Models of Transmission Lines with Skin Effects and Dielectric Loss", IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications, volume 41, Issue 2, February 1994, pages 107-119, and Applicants' assertions, and further in view of Maio et al. "Influence of the Line Characterization on the Transient Analysis of Nonlinearly Loaded Lossy Transmission Lines", IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications, volume 41, Issue 3, Mar 1994, pages 197-209.

15-1.   Regarding claim 2, Yu et al. disclose a method for simulating a transmission line in claim

1. Yu et al. fail to expressly disclose the scattering matrix uses values based upon a low-loss

condition wherein the intrinsic impedance of the line is unaffected by losses, whereby reflection

coefficients for the first and second ports are defined to be zero if the scattering matrix is

normalized to the intrinsic impedance.

Maio et al. disclose the line losses affect the choice of the reference impedance to be used

in the definition of the scattering parameters (page 198, left column, paragraph 1). For example,

the optimum characterization of low-loss lines is therefore defined by $Z_r = Z_o$, leading to $s_{11r} = 0$,

$s_{21r} = h(t)$ (page 201, left column, paragraph 1).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to modify the teachings of Yu et al. to incorporate the teachings of Maio et al. to

obtain the invention as specified in claim 2 because, as suggested by Maio et al., the line losses

affect the choice of the reference impedance to be used in the definition of the scattering

parameters (page 198, left column, paragraph 1).

15-2.   Regarding claim 15, this medium claim include equivalent method limitations as in claim

2 and are unpatentable using the same analysis of claim 2.

Allowable Subject Matter

16.   Dependent claim 13 is not taught by the prior art on record and would be allowable if

rewritten in independent form including all of the limitations of the base claim and any

intervening claims and overcome the above rejections under 35 U.S.C. 101.

17.   Dependent claim 20 is not taught by the prior art on record and objected to as being

dependent upon a rejected base claim, but would be allowable if rewritten in independent form

including all of the limitations of the base claim and any intervening claims.

Applicants' Arguments

18.   Applicants argue the following:

18-1.   Objection to the Drawings

(1) "Fig. 4 cannot be considered to be prior art. The office action does not cite any

references directed to the art disclosed in Fig. 4. Should this objection be maintained, the

applicants request that references be cited showing how Fig. 4 is prior art" (page 6, paragraph 2,

Response).

18-2.   Rejection of claims 1-12 and 14-19 Under 35 U.S.C. §102(e)

(2) Yu does not disclose any scattering matrix. Therefore, Yu cannot anticipate claims 1,

8, and 14 (pages 6-9, Response).

18-3.   Rejection of claims 13 and 20 Under 35 U.S.C. §103(a)

(3) Claims 13 and 20 are deemed allowable by way of their dependence and for other

reasons (page 10, Response).

Response to Arguments

19.   Applicants' arguments have been fully considered.

19-1.   Applicants' argument (1) is not persuasive. In the specification, Applicants assert in lines

4-5 of page 4, "As used herein, an S-parameter matrix, [S], refers to any matrix used to represent

a two port circuit element". Therefore, based on Applicants' assertions, FIG. 4 is not different

from the prior art drawings of FIG. 2 and FIG. 3.

19-2. Applicants' argument (2) is persuasive. The rejections of claims 1-12 and 14-19 under

35 U.S.C. §102(e) in Office Action dated September 13, 2004, have been withdrawn. However,

upon further consideration, a new ground(s) of rejection is made, claims 1-12 and 14-19 are

rejected under 35 U.S.C. 103(a) as detailed in sections **14** to **15-2** above.

19-3. Applicants' argument (3) is persuasive. The rejections of claims 13 and 20 under 35

U.S.C. §103(a) in Office Action dated September 13, 2004, have been withdrawn.

Conclusion

20.   Any inquiry concerning this communication or earlier communications from the

Examiner should be directed to Herng-der Day whose telephone number is (571) 272-3777. The

Examiner can normally be reached on 9:00 - 17:30. Any inquiry of a general nature or relating

to the status of this application should be directed to the TC 2100 Group receptionist: (571) 272-

2100.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's

supervisor, Jean R. Homere can be reached on (571) 272-3780. The fax phone numbers for the

organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private

PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Herng-der Day
May 14, 2005

Thai Phan
Primary Examiner
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